

EAS 4410 – Climate and Global Change

Course Information

- **Instructor** Jie He (jie.he@eas.gatech.edu)
- **Course number** EAS 4410
- **Term** Fall 2026
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Course description

Climate change is among the greatest challenges facing humanity today. The course breaks down the scientific underpinnings of how increasing atmospheric greenhouse gases affect the global climate. Students will be exposed to science from different fields, but no prior knowledge of any of these fields is required. The course consists of 7 Chapters, arranged into three major themes of climate change: mechanisms, evidence and impact.

Introduction

1. Introduction to Climate Change
 - IPCC. Climate vs. weather.Archer Chapter 7, Dessler Chapter 1

Science

2. Atmospheric Radiation
 - Energy. Electromagnetic waves. Blackbody radiation. Radiative properties of the atmosphere.Archer Chapter 2, Dessler Chapter 3
3. Layer Model
 - Solar insolation. Energy balance. Greenhouse effect.Archer Chapter 3, Dessler Chapter 4
4. Radiative Forcing
 - The concept of radiative forcing. Radiative forcing from CO₂, methane, aerosols, etc.Archer Chapter 4, Dessler Chapter 6
5. Climate Feedbacks
 - The concept of feedback. Water vapor feedback. Ice albedo feedback. Cloud feedback. Lapse rate feedback.Archer Chapter 7, Dessler Chapter 6

Evidence

6. Evidence of Global Warming
 - Temperature measurements. Paleoclimatology. Solar forcing. Internal Variability.Archer Chapter 11, Dessler Chapter 2

Impact

7. Impacts of Climate Change
 - Emission scenarios. CMIP projections. Changes in the hydrological cycle, snowpack and extreme weather.Archer Chapter 12, Dessler Chapter 8-9

Course objectives / approved course learning outcomes

By looking at the problem of climate change from multiple angles, students get a decent view of how a modern climate scientist thinks and addresses the complexity of climate science. By the end of the course, the student should have a well-rounded understanding of climate change and will be able to make well-informed assessments of new developments as they arise.

Required course materials

[Global Warming: Understanding the Forecast, 2nd Edition by D. Archer](#)

[Introduction to Modern Climate Change, 3rd Edition by A. Dessler](#)

Roughly 70% of the course material can be found from these 2 textbooks.

Grading policy and weighting

Homework: 20%

Homework will be given out at the end of every chapter and due one week later. For late submissions, there will be a 10-point deduction per day. Students need to provide all necessary steps and will lose 50% credits if they only provide the final answer.

Exam I, II, Final: 50%

All exams will be closed book. Exam I covers the first half of the course and Exam II covers the second half. The final exam includes the whole course. The best 2 scores (out of 3) will be used for calculating the final grade.

Quiz: 30%

Quizzes are given in class, usually at the end of each chapter. Each quiz consists of 5-10 multiple choice questions.

- Grading scale: A(90-100), B(80-89.99), C(70-79.99), D(60-69.99), F(below 60).

Attendance policy

Attendance is not monitored.

Additional criteria for successful completion of the course

Not applicable.

Academic honesty / academic integrity statement

Students in this course are expected to uphold the highest standards of academic integrity as defined by the Georgia Institute of Technology *Honor Code*. All submitted work must represent your own efforts unless collaboration is explicitly permitted.

Academic misconduct includes, but is not limited to, cheating, plagiarism, unauthorized collaboration, fabrication or falsification of data, and facilitating dishonesty by others. The use of unauthorized resources—including solution manuals, online answer repositories, or unapproved AI tools—on assignments or exams is prohibited.

Unless otherwise specified, you may discuss general approaches to coursework with peers, but all submitted work must be completed independently and written in your own words. Any external sources, including published materials or digital tools, must be properly cited.

Suspected violations will be reported to the Georgia Tech Office of Student Integrity and may result in academic and disciplinary sanctions consistent with Institute policies.

By enrolling in this course, you acknowledge your responsibility to understand and comply with these standards.

Statement about acceptable student conduct

Students in this course are expected to adhere to the standards of academic integrity and personal conduct established by the Georgia Institute of Technology. All students must comply with the policies outlined in the Student Code of Conduct and the Honor Code.

Academic misconduct—including, but not limited to, cheating, plagiarism, unauthorized collaboration, or falsification of academic records—is strictly prohibited. Any suspected violations will be reported to the Office of Student Integrity and may result in disciplinary action.

Students are also expected to contribute to a respectful and inclusive learning environment. Disruptive behavior, harassment, or discrimination of any kind will not be tolerated and will be addressed in accordance with Institute policies.

By remaining enrolled in this course, students acknowledge their responsibility to understand and comply with these expectations.

Statement about services offered through the Office of Disability Services

Georgia Tech Office of Disability Services (ODS) collaborates with students, faculty, and staff to create an inclusive learning environment for students with documented disabilities. ODS provides a range of services, including academic accommodations, consultation, and advocacy support, to ensure equal access to educational opportunities.

Students seeking accommodations must register with ODS and obtain an accommodation letter. Once approved, students are responsible for communicating their accommodation needs with the instructor in a timely manner so that appropriate arrangements can be made.

For more information about available services or to begin the registration process, please contact the Office of Disability Services directly.

Core IMPACTS statement

Not applicable.